12-5-2006

UM professor: Acidification a looming threat for Earth's oceans

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NEWS RELEASE

Dec. 5, 2006

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UM PROFESSOR: ACIDIFICATION A LOOMING THREAT FOR EARTH'S OCEANS

MISSOULA —

We should be concerned -- even alarmed -- by the changes now under way in our world's oceans.

That's the message University of Montana paleontologist George Stanley brought home from a New York City conference titled "Ocean Acidification: Modern Observations and Past Experiences" earlier this fall.

An expert on modern and ancient coral reefs, Stanley was a keynote speaker at the prestigious gathering, which featured climate modelers, chemists and other scientists from a dozen countries around the globe. The conference and workshop was held at Columbia University's Lamont-Doherty Geological Observatory.

"The overall conclusion of our group is that the seas are gradually growing more acidic because of global climate change," Stanley said. "This adversely affects the important calcifying organisms -- like plankton and reef-builders -- by dissolving their skeletons."

If it gets as bad as some scientists suggest, ocean acidification could cause a collapse of food chains under the waves, mass extinctions and starvation for people dependent on the sea

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for food.

Most researchers are convinced that human activities since the onset of the Industrial Revolution have increased emission of greenhouse gases such as carbon dioxide, which warms the world and causes global climate change. About half of this CO_2 is absorbed by the oceans. In fact, a Nov. 20 New Yorker article that mentioned the conference Stanley attended says every American contributes an average of 40 pounds of CO_2 to the oceans each day. At this time, much more carbon is taken up by the oceans than emitted.

Stanley says this CO_2 in the ocean forms carbonic acid -- the same substance that makes a can of Coke fizz. And like Coke an acidic ocean can dissolve things -- even the skeletons of calcifying organisms that make up basic plankton and corals.

"Scientists at the conference showed how little micro-plankton -- the basis for the whole food chain -- now show little pits and scars and signs of dissolving in the surface waters," Stanley said. "And given our current human population and expectations of how CO_2 will rise, the prognosis is pretty scary because the acidity is rising at an exponential rate."

Stanley says the world's reefs, which cover about 20 percent of the ocean floor and contain about 50 percent of biological diversity in the seas, already are stressed by human pollution and warming temperatures. This stress can lead to bleaching, in which reefs die and turn white when they part ways with the symbiotic algae they need to grow. And now rising acidity adds another stress that may wipe out all reefs worldwide in coming decades.

Stanley grew up in Florida where he learned to scuba dive, and today the reefs he enjoyed as a youth have suffered "the white death" and are overgrown by algae. Reefs he

Stanley said scientists don't know exactly when the tipping point will occur in which the ocean becomes too acidic for many forms of marine life. Expectations range from 2020 to 2075 or farther, but the day is coming if current trends continue unabated.

He said conference participants came to the consensus that ocean acidification effects will differ across different marine environments, but they cannot be determined with any certainty based on current understanding. Continued research is needed.

Participants think a new, internationally coordinated research initiative is needed to assess the consequences of ocean acidification. Stanley said this most certainly should include our understanding of past changes in ocean carbonate chemistry and the biotic responses of ancient organisms to these changes.

Stanley said, "I think that old adage holds true in this case: History is our teacher, and those who fail to learn from the past are doomed to repeat it. At the conference we were so impressed by the findings that many became emissaries to distribute this news."

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